International Journal of Instruction *April 2024 ● Vol.17, No.2*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 519-538

Article submission code: 20230616173146
Received: 16/06/2023 Revision: 27/10/2023
Accepted: 13/11/2023 OnlineFirst: 22/01/2024

Development of Project-Based Flipped Learning Media to Achieve Nurse's Critical Thinking, Creative, and Spiritual Attitude

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Learning media development plays an important role in nursing training. This study aims to: 1) evaluate the feasibility of project-based flipped learning media in nursing training, and 2) analyze differences in critical thinking ability (CTA), creative thinking (CT), and spiritual attitudes (SA) of nurses between those who practice using project-based flipped learning (PjBFL) media and those who practice with conventional online media. This research uses a mixed-method approach. The first phase is developing learning media and conducting interviews with research subjects, then conducting experiments with a quasi-experimental pretest and posttest control group design. The learning media developed are electronic modules and learning videos. Learning media has been validated by 5 learning media experts and 5 learning content experts. The results of the expert validation were then carried out in one-to-one trials involving 3 nurses, small group trials involving 9 nurses, and one-class trials. The results of the implementation showed that the posttest scores for CTA, CT, and SA of nurses were higher than the pretest scores. The results of multivariate testing showed that there were differences in the results of CTA, CT, and SA between those who practiced PjBFL media and conventional online nursing training. As a conclusion, this research has produced learning media products based on PjBFL that are feasible, effective, and have advantages as learning media for use in nursing training. The superiority of PjBFL media is proven by the experimental results that PjBFL media has a higher effect on the CTA, CT, and SA of nurses.

Keywords: media, PjBFL critical, creative thinking, spiritual attitude, project-based flipped learning

Citation: Sudarmika, P., Santyasa, I., W., Tegeh, I. M., & Sudarma, I. K. (2024). Development of project-based flipped learning media to achieve nurse's critical thinking, creative, and spiritual attitude. *International Journal of Instruction*, *17*(2), 519-538. https://doi.org/10.29333/iji.2024.17229a

INTRODUCTION

The COVID-19 pandemic is a global problem that has both positive and negative impacts on the world of education. One of the positive impacts of COVID-19 on the world of education is the increase in online-based learning as a result of physical and face-to-face restrictions (Dewart et al., 2020). The impact of COVID-19 has made the learning process even more difficult, especially for institutions and teachers because they have to use technology as part of education (Khurshid et al., 2020). The need to create innovative, collaborative, and technology-rich online education programs has been identified to support new nurses in providing increasingly complex care (Bagshaw, 2020). The development of learning media is very necessary because nurses are often faced with critical situations, so they need to be trained in critical thinking ability (CTA) and creative thinking (CT). Nurses must be able to reflect on their actions and consider the possible consequences of each action (Shirazi & Heidari, 2019). CTA is also a requirement for 21st-century learning (Nussbaum et al., 2020). Creativity is an important element of the problem-solving process. Reasoning based on observation can be a tool to increase creativity. The use of open-ended questions allows creativity to be explored in greater depth, adapting to different backgrounds and levels of knowledge. Positive emotional stimulation has an emotional regulatory effect that impacts CTA (L. Wu et al., 2020).

Positive emotionality can be found in spiritual attitudes. Spirituality has the highest human values, such as faith in God, respect for others, piety, service, optimism, and honesty (Sakhaei et al., 2020). Nurses as the front line in health services should not only have cognitive, affective, and psychomotor abilities but also positive SA, all of which must always be honed to maintain the performance of nursing services to the maximum through routine training. The Covid-19 pandemic has also disrupted nursing and midwifery education. These disruptions have long-term implications for the nursing and midwifery workforce for future health care (Lazenby et al., 2020). Lack of infrastructure, financial constraints, and poor quality hardware and software can lead to frustration, learning disorders, and resistance to technology in nursing education (Singh & Masango, 2020). The pandemic has created unprecedented challenges for nursing education, namely the limitations of face-to-face learning and hands-on clinical experience (Beltz et al., 2020).

Technical training requires better implementation in terms of organizers, processes, outputs, facilitators, and learning media used such as in Basic Life Support (BLS) training. The results of a preliminary study through an online questionnaire involving 413 nurses obtained data as many as 291 respondents (70.5%) chose BLS training as the core training they wanted to carry out. The results of the study also found that the form of media that is expected to help learning as many as 391 respondents (94.7%) chose audio-visual media as the expected media and as many as 326 respondents (78.9%) stated audio-visual media as a medium that helps learning. The development of learning media using technology has many benefits, but there are large gaps in access to and training in technology in nurse education and health settings as well as challenges regarding the nature, cost, and high turnover of technology used in teaching and learning (Mohammed & Abdelmoneim, 2018).

The description of the importance of learning media can provide benefits for nurses to learn to be independent, active, fun, and effective (Chiang & Lee, 2016; Fatimah, 2018; Pratiwi & Santyasa, 2021). We can find independent and active learning processes in project-based learning so that the development of project-based flipped learning (PjBFL) media is expected to be a solution in stimulating nurses to improve CTA and creative abilities. Project-based learning (PjBL) can be implemented in lectures as well as in the scope of training (Emery & Morgan, 2017), has a positive effect on student resilience while studying during the Covid-19 pandemic (Rahayu & Fauzi, 2020), and can answer challenges such as problem-solving compared to traditional classroom learning (Bhagi, 2021). PjBL has been widely used in the nursing world to help improve reflective thinking behavior (Suvithayasiri et al., 2020). PjBL can develop students' thinking skills both independently and in groups, solve a problem with an inquiry process, develop thinking skills, develop creativity (Fatimah, 2018), and encourage collaboration in a team (Chiang & Lee, 2016). PjBFL allows students to use their time outside of class to be more involved in group activities such as interactive discussions about the concepts they have learned. Students also have more time to clarify things that are difficult for them to understand. Therefore, the classroom will be a place where active learning takes place promoting meaningful learning (Pratiwi & Santyasa, 2021). The influence of PjBFL media in efforts to improve CTA, CT, and SA has not been found in a literature search, so in-depth research is needed as a form of novelty in nursing training.

Literature Review

Project-Based Flipped Learning (PjBFL) Media

Learning media in nursing education has an important role for educators and students. E-module learning media makes it easier for students to understand material concepts, analyze arguments, or answer questions according to relevant sources, and facilitate the learning process anywhere at any time with efficient technology (Serevina et al., 2022). Electronic modules are a potential alternative to be developed because they do not require expensive printing costs, are easily accessible anywhere and anytime, are efficient, and are environmentally friendly (Sirwan et al., 2021). The use of electronic media for learning influences learner attitudes related to information seeking (Sari & Auliya, 2021). The project is suitable for educational institutions that emphasize independent learning and building comprehensive understanding. Products are designed in such a way as to apply communication, collaboration, critical thinking, creativity, and innovation skills by selecting process-oriented, product-oriented courses, student basic mastery, and teaching skills (Rini & Cholifah, 2020).

Critical Thinking Ability (CTA)

Critical thinking is related to metacognition as an internal motivational tendency to solve problems and make decisions using specific reasoning by comparing alternatives to the decisions to be taken (Chirelli & Sordi, 2021). Critical thinking is one of the supporting factors in academic achievement as an important component in clinical decision-making, nursing practice, and education. Critical thinking is a key component in problem-solving and nurses must be able to make big decisions independently and

quickly in critical situations (Shirazi & Heidari, 2019). Lou defines critical thinking as a process that includes evaluation, opinion, information, and resources that provide information coherently and logically and are related to beliefs derived from cognitive aspects. Based on the above understanding, it can be concluded that the ability to think critically is the ability to think processes starting from evaluating, giving opinions, conveying information sequentially, and meeting logical criteria.

Creative Thinking (CT)

Efforts to improve creative thinking skills can be carried out by involving students to be active through the use of learning media that are appropriate to their learning style (Hasan et al., 2021; Komarudin, 2022). One example of learning media is an electronic module that can be accessed via a computer, laptop, smartphone, or tablet (Rahmat & Jaya, 2020; Susantini et al., 2021). The advantages of e-module learning media are that they are supported by interactive media such as video, audio, animation, and other interactive features that can be played and replayed (Asmianto et al., 2022; Sidiq & Suhendro, 2021). The e-module learning media is considered innovative because it can display teaching materials that are complete, interesting, interactive, and carry good cognitive functions (Prihatiningtyas & Alimah, 2021; Wijaya & Vidianti, 2020) so that it is easier to understand learning material (Dewi & Lestari, 2020; Hamid et al., 2020). The selection of learning methods is very important in the preparation of learning media (Aufa et al., 2020) one of which can use project-based learning methods (Dewi & Lestari, 2020). Project-based learning is a scientific learning model that gives freedom to plan learning activities, carry out projects collaboratively, and ultimately produce work products that can be presented (Sumarni et al., 2016). The project-based learning model develops guiding questions so that they influence learning outcomes and levels of creativity.

Spiritual attitude (SA)

Law of the Republic of Indonesia No. 20 of 2003 concerning the National Education System states that the goal of national education is to develop the potential of students to become human beings who believe in and fear God Almighty and become citizens who are democratic and responsible. The aim of this education is the main goal in efforts to improve the quality of human resources in terms of spiritual, cognitive, affective, emotional, social, and self-sufficiency which is a form of national personality with character. Therefore, every education including nursing education must always strive for the development of spiritual abilities and attitudes. The field of nursing science itself views that care for patients must be carried out as a whole (Savel & Munro, 2014). Spirituality is a multifaceted concept with various definitions. Exploring the perspectives of nurses, nursing students, and patients on spirituality and spiritual care is important to gain a good understanding of how these concepts impact the nursing profession (Galutira et al., 2020). The personal spirituality of the nurse has an impact on the spiritual nursing care provided (Deluga et al., 2020). Evaluating spirituality can help nurses to self-reflect and promote growth, thereby positively influencing the nursing care provided to patients (Leeuwen & Schep-akkerman, 2015; Lopez et al., 2015).

METHOD

This study uses a mixed methods approach (mixed method design). The development design adopts the Borg and Gall development model (Dale & Borg, 2007). Instructional media development research procedures according to Borg and Gall, namely 1) research and information gathering, 2) planning, 3) initial product development, 4) initial product trials 5) initial product revisions to produce the main product, 6) field trials 7) revision of product from field trial 8) operational field test 9) revision of operational product 10) dissemination and distribution of the final product. Product development resulted in 10 e-modules and 18 learning videos. The design of the one-class test uses the pretest and posttest one group design and product implementation uses a quasi-experimental pretest and posttest control group design. This research has received ethical feasibility from an independent research ethics commission with No: 1199/UN14.2.2.VII.14/LT/2022.

Participants

The formative test process in this study involved 5 content experts, 5 learning media experts, 3 individual nurse subjects, 9 small group nurses, and 1 class (25 people) nurse in the field test. The summative test process in this study involved 2 classes (50 people) of nurses. Research participants have given informed consent as a form of consent.

Research instrument

The one-class trial instrument and operational trial used the CTA test, project assessment observation sheets, and a spiritual attitude questionnaire. The instrument used is the extended response multiple choice test. The test results obtained were 10 (25%) tests were declared not used and 30 test items (75%) were used as research instruments for CTA. A trial of a CT instrument using a checklist of action procedures to perform cardiopulmonary resuscitation in adults involved 30 nurses. Internal consistency is obtained from items in the consistent category (r-value> 0.3) and reliability in the reliable category (Cronbach's Alfa 0.85>0.7). The instrument for obtaining SA data is based Spiritual Attitude and Involvement List (SAIL) consists of 8 subscales namely, 1) meaningfulness; 2) trust; 3) acceptance; 4) awareness of the present moment; 5) concern for others; 6) relationship with nature; 7) transcendental experience; and 8) spiritual activities (Deluga et al., 2020).

FINDINGS

In the early stages, learning media products were tested for expert validity involving 5 learning media experts. The selection of learning media experts was based on learning media expertise involving 2 Professors in Educational Technology and 3 Doctors in Educational Technology. The validation of learning content experts involved 5 validators 2 doctors in nursing and 3 nurses in the field of emergency nursing who had certificates of Train of Trainer for emergency and disaster and had experience in the emergency field for > 10 years.

Table 1
Media expert evaluation results and learning content

Validator	Coefficient Aitken							
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Total	n(c-1)	V
Media expert	35	34	33	32	36	170	180	0.94
Learning content expert	74	74	75	73	74	370	375	0.98

Table 1 shows the validation results from learning media experts with an Aitken coefficient of 0.94 (very valid category). The validation results of 5 learning content experts were obtained with an Aitken coefficient of 0.98 (very valid category). Furthermore, the initial product revision was carried out. The results of this initial product revision are then stored in the form of a Learning Management System (LMS) using a Moodle-based application. The results of in-depth interviews with 3 nurses in the one-to-one learner trial found that the material was very clear, easy to understand, easily accessible using mobile devices or laptops, material, systematic, and completed rational learning time. The results of the small group trial were obtained with an Aitken coefficient of 0.90 (very valid category). The results of the one-class tryout used a pretest and posttest design.

Table 2
Pre-Test and Post-Test CTA, CT, and SA one class trial results

Variable	Mean	Median	Variance	SD	Minimum	Maximum
CTA pre-experiment	52.16	53.33	165.75	12.87	30	74.17
CTA post experiment	84.86	83.3	44.49	6.67	76.67	100
CT pre-experiment	59.20	60	582.66	24.13	20	100
CT post experiment	97.02	96.74	1.49	1.22	94.75	99
SA pre-experiment	75.09	74	65.30	8.08	64.67	90.67
SA post experiment	81.03	78	86.36	9.29	69.33	100

Table 2 shows the results of the pretest during the use of learning media, the average CTA post-experiment, the CT values post-experiment, and the SA post-experiment were found to be higher than the pretest values. Then the test is continued by using the paired t-test.

Table 3
Analysis results of CTA, CT, and SA one class trial

Variable	Training before using PjBFL media		Training after using PjBPL media		Mean difference	*p*
	Mean	SD	Mean	SD		
CTA	52.16	12.87	84.86	6.67	32.70	0.001
CT	59.20	24.13	97.02	1.22	37.82	0.001
SA	75.09	8.08	81.03	9.29	5.94	0.001

Table 3 shows the training participants' CTA obtained a mean difference of 32.70 with a p-value of 0.001. The CT ability of the training participants obtained a mean difference of 37.82 with a p-value of 0.001. The SA of the training participants obtained a mean

difference of 5.94 with a p-value of 0.001. The training success criterion based on training standards is 90% attendance, with an overall average final score of 75. Based on these provisions when compared with the CTA, CT, and SA post-test scores, it can be concluded that the learning media products produced are effective.

The summative test in this study involved 50 nurses with 25 experimental group nurses and 25 control group nurses.

Table 4
Description of CTA, CT, and SA

	Participant (n=50)	
Variable	Experiment class (n=25)	Control class (n=25)
CTA pre-experiment (mean±SD)	62.56±8.35	64± 7.13
CTA post experiment (mean±SD)	87.73±4.71	84.13 ± 6.26
CT pre-experiment (mean±SD)	76.80±6.59	76.60±8.86
CT post experiment (mean±SD)	97.63±0.86	96.87± 1.07
SA pre-experiment (mean±SD)	75.60±7.01	75.17±7.22
SA post experiment (mean±SD)	85.62±5.95	81.51±7.98

Table 4 shows the CTA of the BLS training participants was descriptively higher in the class that practiced using PjBFL media compared to conventional online classes. CT BLS training participants showed an increase in scores in the class that practiced with PjBFL media compared to conventional online classes. The SA results show an increase in score achievement in classes that practice with PjBFL-based learning media compared to conventional online classes.

Hypothesis test

The data that has been collected meets several requirements for hypothesis testing analysis, including data normality tests, homogeneity tests, linearity tests, multicollinearity tests, and multivariate normal distribution.

Table 5
Multivariate test

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.981	751.055[b]	3.000	43.000	0.000
	Wilks' Lambda	0.019	751.055[b]	3.000	43.000	0.000
	Hotelling's Trace	52.399	751.055[b]	3.000	43.000	0.000
	Roy's Largest Root	52.399	751.055[b]	3.000	43.000	0.000
Treatment	Pillai's Trace	0.388	9.085[b]	3.000	43.000	0.000
	Wilks' Lambda	0.612	9.085[b]	3.000	43.000	0.000
	Hotelling's Trace	0.634	9.085[b]	3.000	43.000	0.000
	Roy's Largest Root	0.634	9.085[b]	3.000	43.000	0.000
CTA pre	Pillai's Trace	0.059	0.899[b]	3.000	43.000	0.449
	Wilks' Lambda	0.941	0.899[b]	3.000	43.000	0.449
	Hotelling's Trace	0.063	0.899[b]	3.000	43.000	0.449
	Roy's Largest Root	0.063	0.899[b]	3.000	43.000	0.449
CT pre	Pillai's Trace	0.089	1.403[b]	3.000	43.000	0.255
	Wilks' Lambda	0.911	1.403[b]	3.000	43.000	0.255
	Hotelling's Trace	0.098	1.403[b]	3.000	43.000	0.255
	Roy's Largest Root	0.098	1.403[b]	3.000	43.000	0.255
SA pre	Pillai's Trace	0.636	25.028[b]	3.000	43.000	0.000
	Wilks' Lambda	0.364	25.028[b]	3.000	43.000	0.000
	Hotelling's Trace	1.746	25.028[b]	3.000	43.000	0.000
	Roy's Largest Root	1.746	25.028[b]	3.000	43.000	0.000

Description Table 5 found findings, namely 1) the learning media treatment class showed that the price F = 9.085 and p = 0.000, 2) initial CTA showed that the price F = 0.899 and p= 0.449, 3) the initial CT source shows that the price F = 1.403 and p = 0.255, 4) the initial SA source shows that the price F= 25.028 and p= 0.000.

Table 6
The effect of learning media on CTA, CT, and SA

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	CTA post experiment	339.564[a]	4	84.891	2.948	0.030
	CT post experiment	12.187[b]	4	3.047	3.382	0.017
	SA post experiment	1702.580[c]	4	425.645	21.500	0.000
Intercept	CTA post experiment	2048.138	1	2048.138	71.118	0.000
	CT post experiment	1779.841	1	1779.841	1975.792	0.000
	SA post experiment	165.605	1	165.605	8.365	0.006
Treatment	CTA post experiment	140.676	1	140.676	4.885	0.032
	CT post experiment	7.399	1	7.399	8.214	0.006
	SA post experiment	169.817	1	169.817	8.578	0.005
CTA pre	CTA post experiment	62.918	1	62.918	2.185	0.146
	CT post experiment	0.173	1	0.173	0.192	0.664
	SA post experiment	5.748	1	5.748	0.290	0.593
CT pre	CTA post experiment	44.286	1	44.286	1.538	0.221
	CT post experiment	3.237	1	3.237	3.594	0.064
	SA post experiment	0.486	1	0.486	0.025	0.876
SA pre	CTA post experiment	8.351	1	8.351	0.290	0.593
	CT post experiment	0.238	1	0.238	0.264	0.610
	SA post experiment	1476.589	1	1476.589	74.585	0.000
Error	CTA post experiment	1295.960	45	28.799		
	CT post experiment	40.537	45	0.901		
	SA post experiment	890.877	45	19.797		
Total	CTA post experiment	370861.26	50			
	CT post experiment	472983.36	50			
	SA post experiment	351815.77	50			
Corrected Total	CTA post experiment	1635.524	49			
	CT post experiment	52.724	49			
	SA post experiment	2593.457	49			

Table 6 shows the following findings:

First, the effect of the PjBFL media treatment class on CTA post-experiment showed a value of F = 4,885; p 0.032. *Second*, the effect of the PjBFL media treatment on CT post-experiment showed a value of F = 8.214; p =0.006. *Third*, the effect of the PjBFL media treatment class on the SA post-experiment showed a value of F = 8,578; p 0.005. *Fourth*, the effect of the CTA pre-experiment shows a value of F = 2.185; p=0.146. *Fifth*, the effect of the CTA pre-experiment on the CT post-experiment, was obtained with a value of F = 0.192; p = 0.664. *Sixth*, the effect of the CTA pre-experiment on the SA post-experiment, showed a value of F = 0.290; p= 0.593. *Seventh*, the source of the influence of the initial CT on the CTA post-experiment, showed a value of F = 1.538; p = 0.221. *Eighth*, the effect of the initial CT on the CT post-experiment, shows a value of F = 3.594; p=0.064. *Ninth*, the source of the influence of the initial CT on the SA post-experiment, shows a value of F = 0.025; p=0.876. *Tenth*, the effect of the initial SA on the CTA post-experiment, shows a value of F = 0.290; p = 0.593. *Eleventh*, the effect of

SA on the CT post-experiment, shows a value of F = 0.264; p = 0.610. *Twelfth*, the effect of the initial SA on the SA post-experiment, shows a value of F = 74.585; p=0.000.

DISCUSSION

The Feasibility and Effectiveness of PjBFL Media

This research has produced products in the form of e-modules and learning videos which are accessed through a Moodle-based learning management system. The feasibility of learning media that was developed based on learning media experts was found in the appropriate category as a product of nursing training. The effectiveness of the learning media developed is proven by the higher posttest score compared to the training success criteria. The learning media that have been developed are feasible as training products because quantitatively based on expert validation it is found in a very valid category. Consistent with the findings of Dewi Masruroh and Yuli Agustina (2021) e-modules are learning tools made electronically with a systematic arrangement for independent and interactive learning with presentations in the form of text, images, animations, and videos. This explanation is consistent with Prasetya's opinion that E-modules as technology-based modules are equipped with formative tests or quizzes that allow immediate automatic feedback. Consistent with the findings of Sudarma and friends color is an important factor in the appearance of graphic design because readers will be attracted to colors that can reflect mood and red can give a disturbing psychological impression (Sudarma et al., 2015).

The results of the validation of learning media experts on learning video products found that learning videos whenever possible are linked to e-modules. Audio-visual media has better capabilities than other media because it combines two elements, namely sound and images (Sudatha & Tegeh, 2015). The first and most important guideline for maximizing student attention on educational videos is to keep them short. The median interaction time for videos is less than 6 minutes is close to 100% of students who tend to watch the entire video. Learning videos should optimize cognitive content and minimize useless external cognitive content. Meyer et al mention the principles in the design of learning videos, namely, 1) dynamic images, 2) guidance of the instructor, 3) generative activity, 4) perspective video lecture filmed from the first person, 5) subtitle, 6) video clips that attract attention but are irrelevant will distract students so that students are involved in cognitive processing that does not support instructional goals (Mayer et al., 2020). The use of learning media such as interactive e-modules in the learning process allows teaching materials to be modified to make them more interesting (Fonda & Sumargiyani, 2018). The results of the validation of learning media products based on the user are found in the very valid category. Access to this e-module is done through electronic devices such as computers, cell phones, or tablets. The e-module is considered more innovative because it presents the material in full, especially now that students often open their cell phones rather than books. Another advantage of e-modules is that they can provide information in the form of images or even videos, thus making students/trainees more enthusiastic about learning (Dewi & Lestari, 2020).

The effect of PjBFL media on CTA, CT, and SA

The results showed that there was an effect of PjBFL learning media on CTA, CT, and SA nurses compared to those who practiced with conventional online media. The results of this study are consistent with Jusmaya and Efyanto's research finding that project-based learning has a significant effect on CTA. The results of this study indicate that CTA can be improved by using project-based learning. The results of Aranguis et al also found that project-based learning using real-life scenarios can help reflect on their critical thinking and the challenges communities face in transitioning towards sustainability (Aránguiz et al., 2020). Consistent with the research by Hangklang and Sivasan which found the average score of post-PjBL nursing competence was higher (Hanklang & Sivasan, 2020). The project is considered suitable, especially for educational institutions that emphasize independence in learning and building a more comprehensive understanding. Electronic modules are a potential alternative to be developed because they do not require expensive printing costs, are easily accessible anywhere and anytime, are efficient, and are environmentally friendly (Sirwan et al., 2021). Online learning videos also have positive effects apart from supporting students, video-based learning has also proven to be a powerful reflection tool for educators and has a significant influence in professional development contexts (Sablić & Mirosavljević, 2020).

The significant effect of using video can be attributed to authentic materials that are effective, visualizing, engaging, and fun for young learners (Febiyanti et al., 2021). Video is one of the most powerful learning media for capturing and distributing information as well as providing a learning environment that stimulates students to better understand and retain information (Sablić & Mirosavljević, 2020). In addition to providing knowledge, project-based learning helps students develop critical and creative thinking, teamwork, continuous learning, self-evaluation, and adaptability to change (Anazifa & Djukri, 2017). The use of topics in real-world situations as part of a project-based learning experience has the advantage of having an impact on learning motivation and academic achievement for students (Elbyaly & Elfeky, 2023; Mahasneh & Alwan, 2018). The same thing is also found in flipped learning (FL). FL is effectively used to increase students' CTA. Through the FL model, educators can become more interactive and can create a learning atmosphere at home and in the classroom. The purpose of FL is to produce changes in attitudes, learning outcomes, and good thinking skills. Research results in data analysis that flipped classrooms can affect CTA and learning outcomes (Maolidah et al., 2017; Widyaningrum, 2020). FL has a positive effect on students' knowledge, skills, and engagement so flipping classrooms is recommended and beneficial for academics (Murillo-zamorano et al., 2019).

The effect of PjBFL media on CTA

There are differences in CTA abilities between those who practice using PjBFL media and those who practice conventional online media. The score scores on the CTA of nurses who practiced using PjBFL media were found to be higher than those who practiced using conventional online learning media. In line with Sara Souza Pimenta's opinion that learning videos can be used as learning media during the COVID-19

pandemic. Learning video media can reduce learning difficulties, create independent learning, and attract students' interest (Pimenta, 2021). The research results are also consistent with the opinion of Anggito and friends that the PjBL model that includes videos can help substantially improve critical thinking skills (Anggito et al., 2021). CTA has increased because, during the project-based learning process, students are directly involved so that they have the experience of finding facts through information-seeking activities, collaborating various knowledge from various sources. Learning that develops critical thinking skills must be developed in a learning process that accommodates higher-order thinking skills, taking into account the quality of questions, quality of thinking, and quality of responses (Trisdiono et al., 2019).

Higher academic achievement was achieved by students who studied with the PjBL model (Santyasa et al., 2020). This happens because project-based learning can increase interaction with learning (Pereira et al., 2017) increasing student motivation (Chiang & Lee, 2016). Project-based learning has a positive impact on achieving teaching material competencies (Cervantes et al., 2015; Jacques, 2017). Students have the opportunity to make improvements (Mutakinati & Anwari, 2018) and project-based learning into an organized approach to teaching and learning that engages students in difficult and practical tasks culminating in presentations to audiences or creating repeatable final products. This approach helps students acquire knowledge and skills that will help them live a better life (Chen & Yang, 2018; Elbyaly & Elfeky, 2023). Project-based learning can increase students' CTA (D. S. Rini et al., 2020) to become very good at designing problem-solving programs and implementing problem-solving programs (Arif & Putri, 2022). This is the process that occurs because project-based learning is learning based on student activity.

The effect of PjBFL media on CT

The results of the study have found that there are differences in the CT skills of nurses between those who practice using PjBFL media and those who practice with conventional online media. The opinion of Mingchang Wu and their friends states that creativity is an activity and mindset that has the characteristics of producing new ideas, procedures, and new products (novels) to solve problems that benefit oneself or the community (M. Wu et al., 2018). The results of the study are consistent with Younghee Kim's opinion that project-based learning improves independent and creative learning skills in solving problems. In clinical practice, creative problem-solving abilities and teamwork competencies are important among nurse competencies. The effect of the project-based learning method used on nursing students shows significance in increasing nursing competence (Kim, 2021).

Project-based learning has a significant effect on students' creative thinking skills and improves students' creative thinking skills (Fatimah, 2018). Positive ratings of project assignments and knowledge transfer were shown to be high degrees and related to student ratings and were identified as key factors in learning and student satisfaction (Granado-Alcón et al., 2020). Blended-flipped learning has a positive impact on creative thinking skills, especially in fluency, between the flipped-learning and blended-learning groups (Tabieh & Hamzeh, 2022). The results of Yamin and friends' research

show that project-based learning can be used to improve creative thinking skills. Research conducted by Syarifah & Emiliasari (2019) shows that PjBL can help students improve their abilities and creativity in various ways. The study conducted by Ummah et al (2019) describes the application of project-based learning models and analyzes the increase in student creativity in learning media subjects. The results showed that there was an increase in the application of project-based learning to student creativity. CT is very important especially for educators to develop learning because creativity is the basis for human development and survival (Kaplan, 2019). Project-based learning encourages the teaching and learning process, involves students in the learning process, motivates, and increases student creativity (Astuti et al., 2022; Cahyani, 2021; Koroh et al., 2022; Mursid, 2022). Therefore, project-based learning is the right learning model to increase creativity because it requires students to be directly involved in their learning. In addition, students will also be more interested in learning because the problems used are related to their environment.

The effect of PjBFL media on SA

The results of the study found that there was an effect of PjBFL media on the SA of nurses. There was an increase in nurses' SA scores between those who practiced using PjBFL media and those who practiced with conventional online media. The use of learning media during the teaching process can generate new desires, and motivation, stimulate learning activities, and even have a psychological effect on students (Junaidi, 2019; White, 2020). One application of this SA is the interaction between students and their environment (Ramli et al., 2022). Effective strategies for teaching spirituality and spiritual care have been identified in several studies. Among these are the use of reflection activities (Moene Kuven & Giske, 2019) and a combination of learning methods, questions, case studies, and small group learning (Linda et al., 2015). Involvement in spiritual activities or training programs increases their perception of spirituality and spiritual care (O'Zveren & Kırca, 2018). SA as one of the competencies that students must achieve has implications for the process and assessment of learning aspects of attitudes in each subject (Puji Sulani, 2020).

The results of different studies found that the use of student learning resources has not been able to reflect SA and students' social attitudes seen from the learning experience (Nursobah et al., 2019). The encouragement of goodness is a real manifestation of clarity of conscience apart from being an individual responsibility to society as well as a responsibility between humans and God (Purnomo & Mansir, 2020). The results of Bożek et al (2020) research show that spirituality and health-related behaviors are positively related to psychological well-being, and are also mediated by health-related behaviors. There is a link between personal spirituality and spiritual competence (Mächler et al., 2022). The results of Madelo's research have found that there is a significant relationship between the spirituality of educators and the development of students' 21st-century skills

CONCLUSION

This research has produced appropriate learning media products based on evaluations from experts, one-to-one, small groups and effective based on the results of

comparisons of training success criteria with CTA, CT, and SA skill posttest scores in one class test so that this learning media is suitable for use in nursing training. There are significant differences together with CTA, CT, and SA between those who practice using PjBFL media and those who practice using conventional online media. There is a significant difference in CTA between those who practice using PjBFL learning media and those who practice using conventional media. The CTA of nurses who practice using PjBFL learning media is higher than those who practice using conventional media. There is a significant difference in CT between those who practice using PjBFL media and those who practice using conventional media. CT nurses who practice using PjBFL learning media are higher than those who practice using conventional media. There is a significant difference in SA between those who practice using PjBFL learning media and those who practice using conventional media. The SA of nurses who practice using PjBFL media is higher than those who practice using conventional media.

We suggest using this learning media in nursing training, especially BLS training. The learning strategy used in the PjBFL in BLS training has been able to improve nurses' CTA, CT, and SA so that this learning strategy can be used in nursing technical training. Audio-visual media and e-modules can be a solution in facilitating learning for nurse colleagues.

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